November 12, 1946.

Dr. T.M. Rivers,
Director, Rockefeller Inst. Hosp.,

New York, N.Y.

Dear Dr. Rivers,

Some years ago, a paper appeared by Dr. Valentine and yourself, on symbiosis between two spp. of Hemophilus, involving the interchange of X- and V- factor respectively. This work has been of very great interest to me, as we have been conducting similar experiments using different nutritional variants or mutants of a strain of Escherichia coli. A similar type of nutritional symbiosis (or syntrophism) takes place: for example, a mutant strain deficient in methionine and one deficient in proline will grow quite well together in a synthetic medium which will not support either of the original strains to any extent.

Further work on this phenomenon however, using strains which were marked with several nutritional requirements and other distinctive characters has led us to the conclusion that another process may take plave in such mixed cultures, complicating the situation. This is the appearance of new types in the ~~medium~~ culture, which can only be adequately interpreted by assuming that recombination of genes controlling these characters takes place, that is to say that there is a sexual mechanism in this strain of Escherichia coli. Among these new types are some (prototrophs) which have no nutritional requirements and can grow in the unsupplemented synthetic medium. If you are interested, further details are given in a short note in the Oct. 19 issue of Nature.

Attempts, thusfar, to demonstrate the occurrence of recombination of characters found in natural populations of bacteria have thusfar been unfruitful. For this reason the interaction of Hemophilus parainfluenzae and of H. (hemoglobinophilus) canis is of particular interest to us.

It is not apparent from the data published in your paper that a recombinational mechanism can be excluded; this would require that the original X- or V- requiring types be re-isolated from the mixed culture, and that attempts to obtain a pure culture, requiring neither X- nor V-, fail. Dr. A. Lwoff, who has repeated the experiments in the manner in which they are published, has informed me that he did not attempt to re-isolate the original components either.

Dr. Lwoff also informs that H. canis is not available at any location with which he is familiar. I would appreciate it very much if you could let me know where a strain of this organism can be obtained, or even better, if you could send me transfers of the canis and parainfluenzae cultures which were used in your experiments. On the other hand, we would be equally delighted to hear that you might be interested to conduct such experiments on your own part, since we have had very little experience with these fragile organisms, and their nutrition. Any other information would be helpful, as would reprints of your relevant publications, and would be greatly appreciated.

Very sincerely yours,

Joshua Lederberg.